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Attributing STEC infections to food sources to inform international food standards: results of an international consultation and evidence synthesis

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Introduction: Shiga toxin-producing *Escherichia coli* (STEC) infections pose a substantial health burden worldwide. Circa 2010, STEC infections transmitted via food (as opposed to other routes of transmission) caused more than 1 million human illnesses and nearly 13,000 Disability Adjusted Life Years (DALYs) globally. To appropriately target interventions to prevent these infections, it is important to determine the types of foods leading to these illnesses.

Purpose: Our objective was to determine the food sources of STEC infections, both globally and for the six World Health Organization (WHO) regions (i.e., the Americas, Europe, the Eastern Mediterranean, Africa, Southeast Asia, and the Western Pacific).

Methods: We used data from STEC outbreaks that have occurred globally, collected via WHO contact points and member states. We applied a stochastic model that is able to attribute illness to main food groups using data from outbreaks caused by simple foods (i.e. with ingredients belonging to one commodity) and complex foods (multiple commodities).

Results: STEC outbreak surveillance data received from 27 countries (3 regions) and spanning the period 1998 to 2016 included 919 outbreaks. Of these, 36% were caused by a simple food, 9% by a complex food, and 56% were not attributed to a source. Two hundred and sixty six outbreaks involved cases of haemolytic uremic syndrome (HUS) or deaths. We estimated the most frequently attributed sources of STEC globally to be fruits and vegetables (13%), beef (11%), and dairy products (7%). More than half of the outbreaks globally could not be attributed to any source (60%). The relative contribution of different sources of STEC differed by region.

Significance: Our results show that, while beef as a food remains a key source of STEC illness, other commodities such as vegetables and dairy are also important. Addressing the potential for STEC infection to be transmitted by these foods products will be important to lowering the global burden of foodborne STEC infections.